

# **EXHIBIT 4**



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## “Every ‘Never’ I Ever Said Came True”: Transitions from opioid pills to heroin injecting

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### Background

Historians and social scientists have long pondered the extent to which individuals choose their own paths or are acted upon by wider forces. The entrée of Colombian-sourced heroin into the eastern US heroin market in the 1990s led to a rise in purity and fall in prices nationwide followed by a leveling out of prices in the early 2000s (Ciccarone, Kraus and Unick, 2009a; Rosenblum, Unick and Ciccarone, 2013). As well as offering cheapness and potency, Colombian heroin was inserted into the existing crack cocaine distribution network which allowed it to reach a new population of users (Agar and Reisinger, 2001). Over the same time frame, an enormous increase in the prescription of opioid analgesics formed a second major source in the opiate supply.<sup>1</sup> Opioid pill prescribing grew 533% from 1997–2005 with hydrocodone becoming the leading prescribed medication and oxycodone the top retailed opioid by weight in the United States (Manchikanti, 2007). In 2009 an estimated 201.9 million opioid prescriptions were dispensed (Volkow, McLellan, & Cotto, 2011).

The case of the brand name extended release formulation of oxycodone is particularly noteworthy. *OxyContin* was federally approved in 1995 at a time when prescribing opioids for the relief of chronic pain was becoming more acceptable within US medical practice and tolerated by regulatory bodies. Manufacturer Purdue Pharma aggressively promoted its product as less likely to be abused or cause dependence than other opioid analgesics, spending \$200 million on marketing in one year alone, including the targeting of primary care physicians who were less likely to be trained in pain management or addiction (Van Zee, 2009). Purdue's activities aroused concern from the US Drug Enforcement Administration (US DEA) (United States General Accounting Office, 2003) and in a 2007 court case the company pleaded guilty to falsely misrepresenting the addictive qualities of the drug compared with other pain medications (Webster, 2012). *OxyContin*'s sales continued to rise, however, and by 2010 it ranked 5<sup>th</sup> in all brand-name US retail drug sales

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<sup>1</sup>'Opiate' refers here to drugs extracted from the opium poppy, such as morphine or codeine, or derived from one of these, such as heroin, as well as similar synthetic substances which bind with opiate receptors. 'Opioid' is a subset of 'opiates', used here to denote the more synthetic and semi-synthetic substances such as oxycodone, hydrocodone and methadone but excluding heroin.

and number one in brand-name controlled drugs, earning \$3.5 billion that year (Mack, et al. 2010). Ultimately Purdue Pharma reconstituted its extended release oxycodone tablets to prevent them from being chewed or crushed for sniffing, smoking or injecting, techniques used to circumvent their time-release action. The new ‘OP’ marked tablets replaced the ‘OC’ marked originals in late 2010–2011 and this change may have encouraged some *OxyContin* dependent users to switch to heroin (Cicero, Ellis, & Surratt, 2012). The OP formulation effectively extended patent protection for *Oxycontin*, ensuring Purdue’s monopoly as no extended release generic can be currently approved based on the original patent approval (Meier, 2013).

Since prescription opioids are close pharmaceutical relatives of heroin – a prohibited yet highly sought-after commodity – it is unsurprising that around the prescribed supply lies a large shadowland of borrowed, bought, fraudulently obtained and stolen pills. Diversion of these pharmaceuticals from their sanctioned channels occurs in many forms at every stage of the supply chain throughout North America (Roy, Arruda & Bourgois 2011) and ‘nonmedical use’ climbed alongside sales.

The incidence rate for nonmedical use of pain relievers stayed relatively low and stable for 12 to 25 year olds from 1979 to the early 1990s. Around 1994, the rates rose to approximately 12–13 per 1000 persons for this age group and then sharply thereafter to nearly 50 per 1000 among 12–17 year olds and to over 30 per 1000 for 18–25 year olds in 2001 (CEWG, 2004) From 2002–2004 use spread westwards across the nation from initial high concentrations in the Northeast and Appalachia (Cicero et al, 2005) It has been found to be highest in populations outside of large metropolitan areas (Cicero et al, 2005) and to be more common among men than women (SAMDA). Extended release oxycodone was estimated to have had the highest rate of nonmedical use among opioid analgesics when accounting for the number of people filling prescriptions (Cicero et al, 2007). Treatment admissions for oxycodone misuse rose in both Philadelphia and the San Francisco area between 2009 and 2011 (CEWG, 2011; CEWG, 2012).

From 1997, opioid related overdose hospitalizations began to climb geometrically nationwide, with rates rising from 2 per 100,000 US population that year to 15 per 100,000 in 2009 (Unick et al., 2013) and concerns have been raised about an intertwining relationship between this epidemic in prescription opioid overdose and an incipient nationwide heroin-related overdose trend especially among 20–34 year olds (Unick et al., 2013). Early reports from local drug monitoring systems around the country have reported a pathway between prescription opioid use and heroin (Clark and Elliott, 2001; U.S. Department of Justice, 2001; Ohio Substance Abuse Monitoring Network, 2002; Siegal, et al, 2003). Regional studies have suggested that some prescription opioid users are transitioning to heroin after becoming dependent on *OxyContin* (Daniulaityte, et al., 2006) and other prescription opioid pills which serve as a ‘gateway’ to heroin (Inciardi, et al., 2009) and/or to injecting (Young & Havens, 2011; Lankenau et al., 2012). However, there is a lack of scholarly publications that examine these transitions in greater detail (Lankenau et al, 2012).

Many studies have examined how people become involved in heroin use. The large literature on the ‘gateway hypothesis’ cites tobacco, alcohol and marijuana as the first drugs typically used prior to progression to harder drugs, either singly or sequentially, but does not prove a causal link (eg Fergusson et al, 2005; Kandel, 2002). Transition to injecting drug use has been associated with having a family member who uses drugs or drinks alcohol problematically, stressful family situations, earlier exposure to other injectors, and having friends who think it is acceptable to inject (Sherman, et al, 2002).

The purpose of this qualitative study was to understand the process by which heroin injectors in two contrasting cities had initiated heroin use and injecting prior to and during a pharmaceutical opioid pill epidemic. Philadelphia and San Francisco were chosen for their distinct political economies and contrasting heroin supplies. Philadelphia is highly segregated and the poorest large city in the United States, losing population to outmigration every year from 1959 to 2010 and containing large tracts of de-industrialized, abandoned buildings. San Francisco is a more integrated, global city that attracts immigrants and has been undergoing a long process of gentrification. Philadelphia is primarily supplied with white/beige powder heroin sourced from Colombia while San Francisco mainly receives “black tar” heroin originating in Mexico; each heroin source-form has unique chemical properties, use patterns and medical consequences (Ciccarone 2003 and 2009b).

## Methods

This investigation arose from the Heroin Price and Purity Outcomes study (HPPO) (PI: Ciccarone) funded by the US National Institutes of Health, National Institute of Drug Abuse (NIH/NIDA) which aims to place local understandings of heroin injectors’ drug use, beliefs, behavior and health within a regional and national US structural context. In the two contrasting cities of Philadelphia and San Francisco it uses ethnography and qualitative interviewing which are then set against a wider picture derived from national epidemiological datasets. The ethnographic project in Philadelphia (2007–2012) and San Francisco (1994–2007–2012) (Bourgois & Hart, 2011; Bourgois, et al, 2004; Bourgois et al., 2006) provided a privileged insertion into networks of users and generated the preliminary guiding hypothesis of this interview-based study concerning the changing demography and drug-use trajectory of the contemporary heroin-using population. It informed the preparation of the interview guide and the recruitment priorities and sites. The ethnographic methodology is discussed in further detail in the book *Righteous Dopefiend* (Bourgois and Schonberg, 2009). Some ethnographic observations are provided here as a contextual backdrop but were not all pursued in the interviews.

For the interviews a targeted sampling strategy was used, largely informed by the ethnographic work, with purposive recruitment and some snowballing; sampling techniques often used to access hidden populations (Barendregt et al., 2005). To be eligible for the study interviewees had to be at least 18 years old and self-reported current heroin injectors living in either San Francisco or Philadelphia. Interviewees were recruited in areas of known open drug markets in both cities and through needle exchanges. Particular effort was made to recruit women given that they are less prevalent among this population and to balance sampling of longer-term users (more than 3 years’ use) with more recent users (up to 3 years’ use). Respondents were offered small cash sums of \$15–20 per interview, or for taking the researchers on a ‘tour’ of the local heroin scene, to compensate for their time. All participants were interviewed once in 2012.

Consistent with participant-observation techniques, the semi-structured interviews were conducted by the ethnographers (FM, GK and PB) and PI (DC) at the moment of recruitment in the natural environment of the users. Interviews, for example, were conducted near syringe exchanges, in shooting galleries, parks, on corners where users purchase drugs, in cars on the way to and from purchasing drugs, and in transiently-occupied apartments. This anthropologically-informed qualitative strategy reduced social desirability bias. Interviews usually lasted 1–1.5 hours each. Although the interviews were open-ended, an interview guide was used which included questions on the respondent’s involvement in drug use, their initiation into opiates and injecting, experience of obtaining drugs, methods of administration, history of drug-related health events and contact with clinical services and criminal justice. At the end of the interviews participants were asked if they wanted

information on treatment options and needle exchange. Some shorter interviews were conducted towards the end of the research, once the patterns of pills-to-heroin had emerged so starkly from the data, focusing on heroin initiation experiences and any relationship with opioid pills. Recruitment of new interviewees ceased after 'saturation' was reached determined by new subjects consistently providing redundant information. All the interviews were audio recorded and transcribed verbatim. Transcriptions were verified against the audio recordings for accuracy.

Twenty-two current heroin injectors were interviewed in Philadelphia and 19 in San Francisco. NVivo software was used to assist with data organization and retrieval (QSR International, 2012). Hypotheses generated from the ethnography were tested in the interviews and were revised iteratively as the interviews and coding progressed. The first author (SGM) carried out all of the coding which was reviewed by the senior author (DC). 'Open coding', described by Strauss and Corbin, was carried out to identify concepts and categories and systematically apply them throughout the transcripts (Strauss and Corbin, 1990). The study protocol was approved by UCSF and University of Pennsylvania IRBs and the data (and its collection) are protected by two Federal Certificates of Confidentiality issued by NIH/NIDA.

## Results

### Early Ethnographic Observations

The ethnographers in Philadelphia witnessed an influx of young heroin users, generally from nearby poor white working class neighborhoods and declining suburbs, but also from more affluent areas. They and the PI were alerted to the opioid pills-to-heroin transition phenomenon on a tour of outdoor shooting galleries in Philadelphia on September 29<sup>th</sup> 2011. The following is an excerpt from their fieldnote:

On the way back, two middle-aged white running partners approach us and strike up a conversation about what we are doing. When we explain that we are conducting public health research on heroin use one of the men begins telling us, exasperated that he only started using when he was 44 years old. I think he says he is 52 now. The two of them launch into an angry tirade blaming doctors for getting people hooked on opiates and then cutting off their patients forcing them into injecting heroin. They both say they were first prescribed pills before eventually turning to heroin. The skinnier man is more vehement in his criticism of doctor's liberal prescription of opiates while the other man says that his experience was that he turned to heroin once he was cut off from *Oxycontin*.<sup>2</sup>

This encounter stimulated the inclusion of interview questions about previous experience with opioid pills. Subsequently the ethnographers met younger users who had transitioned to heroin from prescribed and diverted pills. We term this use of opioids 'extra-medical use' rather than 'non-medical use' as it includes unsupervised self-medication for pain relief as well as use for hedonistic purposes and for the relief of withdrawal symptoms.

In Philadelphia, the ethnographers noted a racialized demographic transition pattern in which whites of all ages and older African Americans traveled every day into the Puerto Rican neighborhood to purchase heroin. This regular migration pattern was unambiguous and dramatically visible because of the city's clearly delineated neighborhood segregation. Despite seeking exceptions to this demographic pattern, the ethnographers were only able to

<sup>2</sup>The use of brand names to refer to prescription opioids in this paper reflects the interviewees' descriptors rather than any preference of the authors. The drug with the street name "Perc 30" is not in fact *Percocet* (short acting oxycodone and acetaminophen) but refers to short acting oxycodone products eg *Roxycodone*.

locate a few young African American or Latino heroin injectors and they were all outcasts from their ethnic social networks and neighborhoods whereas older African American and Latino injectors were numerous and lived in segregated ethnic neighborhoods. These ethnic differences cannot be explained by access to heroin: most of the heroin sellers in the ethnographic sample in Philadelphia were young African Americans or Latinos (almost all Puerto Rican) and most consumed opioid pills either recreationally or chronically. Only a handful of these pill users transitioned to heroin or injection and those who did represented distinct exceptions. The few young Puerto Ricans who transitioned to injection were subject to physical and verbal abuse and shaming from neighbors and friends. One Puerto Rican neighbor of the primary ethnographers in Philadelphia, for example, was chased out of the neighborhood when he suddenly openly transitioned from pill consumption to heroin injection.

The San Francisco neighborhoods frequented by heroin injectors were more subject to gentrification and more ethnically diverse than those of Philadelphia. There was a large presence of older African American heroin injectors in the longer term ethnographic study whose first opiate experience was heroin and they were fully integrated into their ethnic social networks that often proudly or aggressively differentiated themselves from other ethnicities. The few young injectors sampled in San Francisco who were African American maintained almost exclusively white friends/acquaintances and decorated themselves with provocatively white-identified alternative cultural markings (usually versions of anarcho-punk or youth-traveler/rainbow tribe symbols). Similarly the young Latino injectors in San Francisco's long-term ethnographic samples either adopted a white ethnic self-representation or only incidentally referred to one of their parents being of Latino origin. We did not focus on ethnicity or socio-economic status in the interview questions given that these demographic questions are more suited to exploration using survey methods.

### **Characteristics of the Interview Study Participants**

Among the Philadelphia sample, 8 were women and 14 were men. Sixteen had used for more than 3 years and 6 for 3 years or less. In the San Francisco sample, 12 were women and 7 were men, among whom 15 had used for more than 3 years and 4 for 3 years or less. Most were unemployed and either homeless or insecurely housed. Some had completed high school but few had any college education. In Philadelphia, users commonly participated in the peripheral economy around drug markets selling syringes or showing users from outside the neighborhood where to buy high quality heroin. In San Francisco, several users sold marijuana to support themselves. Other sources of income across the cities included working in construction, benefits and sex work. The Philadelphia injectors had almost all grown up in and around that city and begun their drug using careers there, while many (14 out of 19) of the San Francisco users were migrants from around the country.

### **Age differences and heroin initiation**

The interview study found a stark contrast in the patterns of heroin initiation between younger (aged 20–29) and older (aged 30 and over) heroin injectors on both coasts. In Philadelphia, all 10 and in San Francisco 8 of the 9 younger heroin injectors had progressed to heroin from opioid pills, termed here 'pill initiates'. All the younger users in Philadelphia and San Francisco (n=19) had started using heroin within the last 10 years, with a mean of age of 25 years and 4.4 mean years using heroin.

Across the two cities there were 10 'recent' users, defined as using heroin for up to 3 years, with nine of them transitioning to heroin from opioid pill dependency. With the exception of the one recent user who had progressed straight to heroin without using pills first, all the recent users were under 30 years old and pill initiates. The initiation of younger users into



heroin through opioid pills coincided with the past decade and a half of high levels of opioid pill prescribing; among younger pill initiates in both cities, the mean year of initiating opioid pill use was 2005 and the mean year of starting heroin use was 2008. Older users primarily transitioned to heroin from other drugs such as marijuana, cocaine or methamphetamine before the profusion of opioid pills in medicine cabinets and on the streets. These straight-to-heroin users are termed here 'heroin initiates'. When discussing pills used before their heroin initiation, a few older users reported taking barbiturates or speed but only one had used an opioid pill (*Dilaudid* – hydromorphone), and on a single occasion. Only one pill initiate had injected any drug before heroin (*Dilaudid*) but four of the heroin initiates were already injectors (methamphetamine or cocaine) when they started heroin. The heroin initiates had often used opioid pills in an opportunistic fashion but only *after* they had started heroin injection.

In Philadelphia, 14 of the 22 participants were pill initiates with a mean age of 31 and 7 mean years' use. Among the eight heroin initiates, the mean age was 44 and their mean years' use was 23. In San Francisco, 11 of the 19 heroin injectors were pill initiates, with a mean age of 29 and mean years' use of 5.8. The eight heroin initiates had a mean age of 50 years and their mean years' use was 20.

We also found an interesting division between patterns of pill use among older and younger pill initiates prior to heroin. While almost all of the younger pill initiates described transitioning to heroin after becoming dependent on (usually diverted) opioids, most of the older pill initiates had either developed a dependence on opioids prescribed to them for injury/pain, like the two users encountered in the ethnographic segment above, or they had used opioid pills only occasionally prior to heroin without reporting dependence. All of these older pill initiates were longer-term heroin injectors and were not part of the widespread social initiation into frequent opioid use characteristic of the younger generation pill initiates.

In the twentieth century the use of pills of various kinds, including barbiturates, benzodiazepines or amphetamines, prior to initiating heroin was not unusual (Kandel, 2002). The key difference in this study's finding is that virtually all of the young/recent heroin injectors in our sample considered themselves already opiate-dependent before they initiated heroin use. While our sample is small and not representative, the numbers are striking nonetheless.

### **Prescription opioid pill sources and distribution**

A few users, both heroin and pill initiates, had been prescribed opioid pills for pain relief, usually short-acting oxycodone with acetaminophen (eg *Percocet*) or extended release oxycodone, at least initially, until their physically required or emotionally desired use outpaced their prescribed supply. The rest reported most of the same pill sources described in national survey data, with the exception of the rarer method of buying on the internet (Substance Abuse and Mental Health Services Administration, 2012): some received them (given or sold) from a friend or relative (both with and without prescriptions) and others took them without asking from friends or relatives; some bought them on the street or at bars from acquaintances and small scale suppliers.

Several users referred to purchasing pills from larger scale suppliers who engaged in "doctor-shopping" and one user had actively doctor-shopped himself. This 25 year old man had started his heroin use as a teenager and, unusually for this age group, was a heroin initiate but started injecting pills afterwards. He described the process of obtaining pills in Florida, a state well-known for its easy access to opioid analgesics, for both personal use and income generation (Vanguard, 2009):

[...] I used to go to Florida and go to the pain clinics you know and go to like 4 different clinics with the same MRI [Magnetic Resonance Imaging scan] of 5 other people and we'd come back to [his home state] with like 10,000 pills and cut them in half you know. Like a lot of people were doing it you know it was really easy for a long time.

Significantly, however, he also mentioned that he kept a supply of heroin to offer clients in case he could not obtain pills for them, remarking "that's actually how I've gotten a lot of people accidentally hooked on heroin." Similarly, many interviewees reported that their street pill supplier usually also offered them heroin – an entrepreneurial merging of the opiate supply that facilitated the transition from pill use to heroin. This 51 year old man in Philadelphia was originally prescribed *Percocet* for a knee injury and despite initially resolving not to use heroin had started 5–6 years earlier:

...I guess like a lot of people, you start on the pills, and then the doctor gives you some and some more [...] I took what he gave me, plus whatever – buy[ing more] on the street, and at some point in time, just the pills aren't doin' it, and they're a little harder to find. [...] Every morning we would go to the one place and they had both things [heroin and pills] but [...] they never were out of heroin, but once in a while – well, three times a week probably, they didn't have the pills. So I'd have to scramble around, and then I finally had enough and said "Fuck. The hell with this, give me a bag [of heroin]!" and was off to the races.

### Contrasting cities and drug markets

Ethnographic findings showed very different drug markets across the two cities. Philadelphia's drug market, where cocaine, heroin, pills and syringes could be bought, was out in the open on street corners or in abandoned buildings (often disused factories) and located in racially hyper-segregated Puerto Rican and African-American areas. San Francisco's high value real estate has shaped a different dynamic. A fieldnote from June 2012 describes an area of San Francisco formerly known for its open drug dealing.

The streets are lively with bar goers drinking in bars that are far hipper, shinier and more in-your-face than the drinking holes of the past. And of course the patrons are whiter and seemingly more affluent. The drug scene is subdued and we see or hear only a bit of dealing. We are offered a variety of pills while working, especially in [San Francisco neighborhood]: roxys (*Roxycodone*/short acting oxycodone), OPs (new *OxyContin* formula), Vicodin (hydrocodone and acetaminophen), *Suboxone* (buprenorphine and naloxone) ....Gentrification has forced down the number of heroin users and also forced the heroin out of SF. We hear repeatedly that Oakland is the only good place to score dope [heroin] these days.

This observation regarding the quality of heroin in San Francisco was confirmed in the interviews and by data from the US DEA's STRIDE database, which showed that over the first decade of the twenty-first century, the purity of San Francisco's black tar heroin has been low and the price high, especially in comparison with Philadelphia's Colombian-sourced powder (Table 1). (STRIDE includes data from undercover purchases and seizures). Opioid pills were found to be much more readily available in San Francisco's diminished open-air drug market than heroin, with correspondingly low prices. The 80mg oxycodone was available for \$20 (\$0.25/mg). In Philadelphia, it was usually priced at \$1/mg. This made it much more cost-effective to buy Colombian heroin in Philadelphia, with a mean street-price of \$0.56/mg-pure (Ciccarone et al, 2009a), particularly considering that the parenteral equianalgesic dose of heroin is 1/2 to 1/3 that of oxycodone.



San Francisco attracts a higher proportion of its population from across the US than does Philadelphia (2010 American Community Survey). While most of the Philadelphia users were born in the city or its suburbs and had started using both opioid pills and heroin there, many of the San Francisco users had initiated their pill and sometimes heroin use elsewhere and had migrated to the city from around the country (8 of 11 pill initiates and 4 of 8 heroin initiates). Most of the pill initiates (6 out of 8) and heroin initiates (4 out of 6) who had moved to San Francisco were already using heroin when they arrived. Among San Francisco natives, most of the pill initiates (2 of 3) and both heroin initiates had started heroin in San Francisco.

A wide variety of reasons for migrating to San Francisco were given, some drug-related and others not. Significantly, however, none of these migrants mentioned the quality of its heroin as a positive draw. In fact one 26 year old pill initiate who had quit heroin use before moving to San Francisco had hoped to maintain abstinence: “when I got out here [I] stayed off of it for a good 3 years and then after I found out where to get good heroin again out here I started doing it again.” Another 26 year old San Francisco migrant and pill initiate, who had been using for 7 years, thought that she would be able to avoid using heroin in San Francisco because of its low quality. She did so for 2 years until she found a contact who was able to supply her with a much higher priced, higher purity white powder heroin unavailable in the open street market.

The contrasting heroin distribution mechanisms, quality and price in San Francisco and Philadelphia may have influenced the likelihood of transition from opioid pills to heroin in each city and relapse among former heroin users. In Philadelphia, with its open drug market, it was easy even for those without contacts among existing users or dealers to obtain high potency and relatively inexpensive heroin. In San Francisco, however, buying higher quality heroin required greater local knowledge and a trip to the nearby city of Oakland or a connection to a dealer who would deliver.

### Progression from pills: crossing thresholds

The typical progression for pill initiates began with chewing pills or crushing them to a powder and sniffing or smoking them. This was often followed by sniffing or smoking heroin and then by injecting it. For most pill initiates, heroin was their first experience of injecting any drug and those who injected the crushed pills only did so after they had already started injecting heroin. Their accounts, which involved crossing thresholds of stigmatized behavior at each stage, attributed this progression to their growing dependence and tolerance, the rising cost of their pill habit coupled with their need to avoid withdrawal symptoms and heroin’s easy availability and comparatively lower cost. Depending on local markets, interviewees and published sources have reported pill prices varying considerably across the country (eg Poitras, 2012).

This account of a transition to heroin after four months using *OxyContin* is from a 28-year old Philadelphia man who had been injecting heroin for 5 years at interview. It typifies many of the younger heroin injectors’ experiences:

A: My buddy [...], the one that introduced me to Oxies was actually doing dope [heroin] at the time. And I came over his house and I was sick [in withdrawal] and I asked him if he could get me an Oxy for ten bucks, which I needed an 80 [mg], which they were [\$]20 and I only had [\$]10. So he basically convinced me and started talking about how Oxies and dope there is no difference.

Q: So is that the first time you’d heard that, that there’s no difference between Oxies and dope?

A:[...] No it wasn't the first time I heard that you know[...]

Q: Did you ever think you were going to become a heroin user?

A: No, I didn't[...] My father is in recovery, he's been sober for like 6 years and he was a heroin user so I swore that I would never touch it because of like him you know but obviously I did.

Older heroin initiates typically described their first use as a social process, offered by a friend, sexual partner or family member, some mentioning curiosity as their motive and a few seeking to 'come down' from stimulant use. Only one interviewee, a heroin initiate, reported seeking out the drug without knowing any other heroin users. More typically, this 56 year old female heroin initiate had been injecting heroin for several decades after transitioning from alcohol, marijuana and crack cocaine:

Q: Okay. So how did you get started; what happened?

A: I was always a curious person. I always hung around grown people, you know, at 14 I was hanging with my first boyfriend [...] So I started going to clubs and stuff like that and the people I hung around did it so I was just curious [...]

Pill initiates' introduction to opiates was facilitated by the lesser stigma and perceived lower risk of opioid pills and many give the impression that they would never have considered trying heroin had they not first become dependent on these pills. Despite the fact that many of the pill initiates were aware of the chemical similarity of opioids and heroin, they perceived pills to be more acceptable and safer than heroin, consistent with the existing literature on non-dependent pill consumers (Daniulaityte et al, 2012). A 25 year old man, who had injected heroin for 7–8 years in Philadelphia explained:

[...] there was always people in my neighborhood like the older guys who already did heroin. I was that type that said, "I'll never do *Oxies*". I was the type that said "I'll never" and every "never" I ever said came true. "I'll never shoot heroin" and you know so yeah the older guys were already doing heroin and I was like, "Dude no way, I'd rather eat a pill."

Some research studies have shown that drug users with varying degrees of experience with illicit drugs perceive *Percocets* and *Vicodin* to be much less dangerous than *OxyContin*, which in turn they considered less dangerous than crack cocaine or heroin (Daniulaityte et al, 2007; 2012). It was common in our study for pill initiates to have used *Percocets* and sometimes short-acting oxycodone street-termed 'Perc 30s' first and then to progress to *OxyContin*. However, this may have simply reflected users' increasing tolerance rather than different perceptions of risk, given the fact that these oxycodone formulations are sold in different dosages: *Percocet* in 2.5–10mg tablets, short-acting oxycodone in 5, 15 and 30mg and *OxyContin* in 10–80mg tablets. While some users, like the 25 year old male quoted directly above, stigmatized *OxyContin*, and breaking through that taboo may have increased the likelihood of transitioning to heroin, other users did not mention any greater risks from *OxyContin* than from *Percocet* or other less powerful opioids.

Crossing the second threshold from opioid pills to heroin may have been eased by not having to transition straight to injecting. As in the post-HIV 1990s, (Chitwood et al, 1998) some new heroin users reported finding sniffing a more acceptable transition before they had started injecting. In Philadelphia the powder heroin can be sniffed and on the West Coast black tar heroin can be smoked on foil ('chased') or sniffed from a nasal inhaler bottle in which it has been dissolved in a small amount of water. A 21 year old pill initiate interviewed in San Francisco who had switched to heroin use five years earlier when his wholesale supplier of pills, a 'crooked doctor', was raided reported that the street prices for opioid pills were unaffordable yet he remained reluctant to initiate injection.

I went to pick up Oxies from one of my connects and he was like, “Oh, I’m out of Oxies but I have black tar.” And at the time I was smoking Oxies. And so I was just like I didn’t want to inject at that time in my life so I was just like, “I don’t want to shoot anything up.” And he was just like, “No, you can smoke them the same way. Just put it on foil and smoke it the same way.” And I was like, “Oh.” I was like, “Well how much can I get for forty bucks?” And he was like, “Half of a gram.” And I was like, “Sure.” And so that lasted me a hell of a lot – that forty bucks went way longer than like if I would have spent it on a pill, which would have lasted me like 25 minutes. It lasted me two days almost.

For most of these pill initiates, by the time they tried heroin there was a sense of physical compulsion and even desperation in their choice. Many of them seemed shocked to have found themselves injecting heroin but for some, even after transitioning to this stage, a new hierarchy of corporeal risk emerged delineated by their preferred location of injection. Most users reported initiating injecting in their arms or legs before resorting to the perceived higher risk or taboo areas of the neck or groin. There was some variation in opinions over which injection sites should be avoided. A 28 year old male pill initiate interviewed in San Francisco had been surprised to find himself injecting heroin a year earlier after previously looking down on injectors. He described how his addiction continued to drive his risk-taking practices:

[...] My neck was kind of one of those places that I kinda thought I never would but I did. I’d say that my femoral [groin] would be another place that I [will avoid] – I mean it’s all a matter of desperation I guess you know when you’re desperate enough and you get to that point.

While users explain their ongoing transitions pragmatically as a response to increasing addiction, tolerance levels and loss of venous access, these decisions take place in changing contexts. As maintenance of their opiate supply becomes an increasing focus of their lives, they may spend more time with other drug users whose norms make otherwise taboo behavior more acceptable, while becoming more isolated from non-drug-using friends and family. One 23 year old female heroin injector in San Francisco explained:

Doing opiates it’s kind of like[...] you *flock together* [her emphasis] [...] I’d been using the OCs [original formulation Oxycontin] not really getting high, just staying not sick, I dunno friends around me have used heroin, it just kinda became a less and less scary and taboo thing.

As Paula Mayock notes, “the type of calculus involved in the making of drug journeys is fluid and relational, socially contingent rather than static” (Mayock, 2005). Not only do the norms change with a changing peer group but once a threshold has been crossed the range of choices look different from the new vantage point.

While some appear to have changed peer group as they progressed, several pill initiates described how friends they had known before their opiate use had guided them along the same path, using opioids first and then heroin, leading them to new sources and modes of administration as they followed in their wake. Others described taking this lead role themselves. This twenty-five year old man in Philadelphia explained:

A: Pretty much 80% of the friends that I grew up with are using [heroin].

Q: So what’s that all about? How’d that happen?

A: Honestly once *Oxycontin* hit the Northeast [of Philadelphia] it was a wrap, that was it. Once *Oxycontin*s came around and everybody started doing Oxies and then when you’re paying 40 dollars a pill and then you hear you can pay ten dollars for the same effect of course you’re going to do it.

Incarceration and institutional contexts, including substance treatment, provided some users with peer influences encouraging their transition to heroin injecting. A twenty-six year old woman who had been using heroin in Philadelphia for seven years learnt about heroin while in a rehabilitation facility after becoming dependent on *Percocet* and *OxyContin*: “Rehab made me sicker every time. It gave me new connects; new places to find things; new ways to do things.”

### Chemical connections

Given the surprise many users expressed about their escalating addiction and their graduation to heroin, we added questions about their awareness of the chemical similarity between opioid analgesics and heroin at the time they began using pills. Many knew that oxycodone and other opioids were related to heroin but some did not. One 21 year old male who had been using heroin for approximately 2 years in Philadelphia described the apparent contradiction in his knowledge :

Q: Did you realize that all of these things, *Percocets* and short acting *Percocets*, 30s, the *OxyContin*s and heroin are also in the same chemical family?

A: I mean at the time you know obviously you know when you’re snorting Perc 30s you’re saying to yourself I’ll never go do *Oxycontin* and then you start doing *Oxycontin* and like I’ll never go do dope and then you’re snorting dope, well I’ll never shoot it. Yeah I mean you know but like in your head it’s just such a different world. But like I’ll tell you what like after I started shooting dope it’s so different. Like every other drug like it’s such a – *it becomes such a lifestyle when you start shooting dope* [emphasis added].

One 17 year old male who sold heroin on the Philadelphia street corner where the two primary ethnographers lived (FM, GK) argued, while he was high on *Percocets*, “There is no f--king way that Percocets could be the same thing as dope [heroin]. I know because I use them... I mean like maybe Xanies [Xanax, a benzodiazepine] might be more like dope [heroin]... but not Percocets... Nah!”

### Supply-side changes

In 2009 Purdue Pharma gained approval from the Food and Drug Administration for its tamper-resistant formulation of *OxyContin* (FDA, 2009). Although many of the pill initiates in this study had transitioned to heroin before the new gel form replaced the old tablets in late 2010/2011, one 29 year old heroin injector explained how the change had prompted his switch to injecting.

I was big into *Oxycontin* at first...and I still used heroin a little bit when *OxyContin* was crushable, but at that point I only sniffed, and I only did it when I had problems finding *Oxycontin*. It wasn’t until the *Oxycontin* switched from OC to OP, and the non-tamper-proof versions [sic], that I really just went straight to heroin and immediately started shooting it, which I guess was a little over a year ago.

This outcome of the reformulation in shifting users away from pharmaceuticals and into heroin was not quite as unanticipated as assumed by some commentators (eg Cicero et al, 2012), at least within the state structures of drug control. The US DEA sent out warnings to various health care organizations at the time of the reformulation, stating that *OxyContin* users switching to heroin was a potential consequence (ODLL, Drug Enforcement Administration, 2010). Supply-side changes also impacted some *OxyContin* users when their sources were cut off following the arrest of prescribers, prompting their switch to heroin. In

2011, a new law in Washington State brought in a raft of controls on doctors managing pain patients with opioids, the results of which will be closely watched (Okie, 2010).

## Discussion

Although the epidemic of extra-medical opioid use and its links with heroin injecting have been reported, (eg US Department of Justice, 2001; OSAM, 2002) there have been very few in-depth studies of the experiences of users transitioning between these drugs, their modes of administration and the contexts in which these developments take place (see Daniulaityte et al, 2006 and Lankenau et al, 2012). To our knowledge, this is the first qualitative paper to compare the contexts of initiation into prescription opioid use and transitions to heroin injection across two generations of current heroin injectors in two distinct US cities.

We found a dramatic contrast between paths of initiation among older and younger heroin injectors. Across both cities, younger heroin injectors (aged 20–29) had almost exclusively progressed to heroin from opioid pills while older heroin injectors (30 years and above) typically exemplified the heroin-first trajectory. All of the recent heroin injectors were under thirty and most were pill initiates. The impression that opioid dependence prior to heroin is a social phenomenon particularly affecting young people was strengthened by the differences we found between younger and older pill initiates. Younger pill initiates were more likely to report dependence on diverted opioid pills prior to heroin initiation whereas the smaller group of older pill initiates had either developed dependence on a prescribed supply or had used pills only occasionally prior to heroin without developing a habit. These changes in patterns of initiation reflect important developments in the heroin and opioid pill markets since the late twentieth century.

Pill initiates' typical pathway of chewing or snorting pharmaceuticals first, followed by non-injecting heroin use and then heroin injecting corresponded with findings from a sample of extra-medical opioid users in Ohio. Likewise, none of the younger users in this study or Ohio had injected pills before injecting heroin (Daniulaityte, 2006). Younger pill initiates who did inject pills started doing so only after initiating injection with heroin when heroin was unavailable. This contrasts with a study of young IDUs in which a number, mainly from Los Angeles, had injected opioids prior to heroin, possibly pointing to variations in different cities' opiate markets (Lankenau et al, 2012) or local taboos around injecting opioid pills. Pill initiates in our study usually reported heroin as being more easily available than opioid pills, a major consideration in their transitions.

Reflecting wider migration patterns, many of the San Francisco heroin injectors had moved to the city from across the country or state, often initiating opioid and heroin use before their arrival, while most of the East Coast group had been born and raised in or around Philadelphia. Philadelphia's high potency, low cost Colombian heroin was therefore more significant in pill initiates' transition from opioids to heroin than the low quality, higher priced heroin available in San Francisco was to the San Francisco group. In fact, this paper found suggestions of a protective effect in the low quality and high price of San Francisco's black tar heroin, helping some recovering heroin users to remain abstinent for several years. Additionally, black tar heroin has been blamed for causing an epidemic of soft tissue infections (Ciccarone, 2001). Speculatively, users suffering venous sclerosis and soft tissue infections may end their injection careers earlier.

This possible protective effect related not only to the price and quality of the heroin available in San Francisco but the ease of access through which users could obtain a desirable product. Rapid gentrification of former drug dealing areas has constricted San Francisco's open street market in heroin, widely acknowledged to supply low quality, high



price heroin. San Francisco users required more savvy local knowledge and networks to locate higher quality heroin. Philadelphia's easily accessible street market did not require such contacts or local knowledge. The potential of these different structures of retail market to affect opiate user's patterns of initiation, abstinence and relapse are important early findings requiring further inquiry.

Many pill initiates mentioned that their usual suppliers offered them heroin when they were unable to obtain opioid pills for their friends or customers. Several described their initial reluctance to try heroin, requiring persuasion regarding the equivalence of opioids and heroin or reassurance that they would not have to inject. Others reported simply giving in to the frustration of trying to maintain or afford a regular pill supply. This entrepreneurial merging of heroin and opioid supplies by dealers is a novel finding which helps to explain the process of transition among pill initiates.

This paper posits an unfolding process of transition during which pill initiates' perspectives on risk and taboo continued to change and initiation into heroin injection was not the end point but another threshold into a new set of corporeal risks around injection sites. Among these pill initiates there was a pervasive sense of shock and surprise at finding themselves injecting heroin. The motives of curiosity about the effects of heroin and seeking peer approval described in the heroin epidemics of past eras (Finestone, 1957; Sutter, 1966; Stephens, 1991; Chitwood, et al, 1998) did not typically describe the experiences of these pill initiates when first considering trying heroin. As reported elsewhere, their escalating risk was propelled by increasing dependence and economic considerations (Lankenau, 2012). These driving forces were the same as those reported by heroin initiates transitioning from sniffing or smoking to injecting heroin in this study and elsewhere (Sherman et al, 2002).

Drug users' perceptions around the relative risks of opioid pills and other drugs have been studied (Daniulaityte et al, 2007 and 2012) but there is little known about their understanding of the chemical relationship between different forms of prescription and illicit opiates. A number of interviewees mentioned that they were aware that heroin and opioid pills were related or chemically equivalent before they had transitioned to heroin while others were not. Those who were aware of the similarity still seemed to consider heroin the most stigmatized opiate. Further exploration is needed of the implications for decision-making of different levels of knowledge about the chemical relationship between opiates.

Data from the ethnographic research suggest that pill initiate heroin injectors are predominantly white in the two cities studied. Survey data suggest that this is typical of the wider using population over the last two decades, with white heroin injectors making up a larger proportion of those seeking treatment and a 44% decline in African-American heroin injectors seeking treatment from 1992–2004 (Broz and Ouellet, 2008). This pattern has also been found in regional studies, where injecting continued to be the most prevalent mode of administration among young white heroin using arrestees while young African-American and Hispanic arrestees were less likely to use heroin and those who did were more likely to sniff than inject (Golub et al, 2005).

Opioid pill use is more common among whites and Hispanics than African-Americans with 4.6% of whites, 4.5% of Hispanics and 3.8% of African-Americans nationally reporting nonmedical use of prescription pain relievers in the previous year (SAMHSA, 2012). Given the frequency with which users reported acquiring pills from friends' or family members' prescriptions or their own, the higher prevalence of extra-medical use among whites may reflect the greater likelihood of whites to receive patient prescriptions for opioid analgesics than African Americans but does not explain the equally high prevalence in the Hispanic population who are also less likely to receive opioid prescriptions for pain relief (Pletcher et



al., 2008). Golub et al reported regional ethnic variations in opioid pill use among a national sample of arrestees but unfortunately their data source did not distinguish between legitimately prescribed and diverted opioids (Golub et al, 2013) and may therefore reflect, at least in part, variations in access to healthcare. The relationship between ethnicity and opioid use and transitions to heroin has not been studied in depth and further research is therefore needed to explore the effects of ethnicity, segregation, socio-economic status and geography on those paths taken and not taken.

Our paper is the first to report the US DEA's warning to health care organizations that an increase in heroin use was a potential consequence of the reformulation of *OxyContin*; a warning that seems to have been largely ignored. The reformulation occurred after most pill initiates in this study had switched to heroin so its impact on such transitions is not addressed here. However, research on opioid users in treatment has shown a move from *OxyContin* to heroin following this change (Cicero et al, 2012). The decision-making process around *OxyContin*'s reformulation and the ensuing public health consequences require further investigation.

## Conclusion

From the accounts of younger/recent heroin injectors in this study, it is evident that since the rise of the opioid pill epidemic, the barriers to heroin use and to injection have been reduced by the normalized pervasiveness of these pharmaceuticals. The widespread availability of opioid analgesics outside sanctioned channels and, paradoxically, medical and regulatory attempts to curb this through monitoring and limiting prescribing, appear to be drawing a new generation into higher risk heroin injecting. Unlike those substances previously labeled 'gateway drugs', opioid pills seem to have a direct relationship with progression to heroin initiation.

It is ironic that heroin, one of the few drugs entirely prohibited under US drug control laws, remains so widely available and relatively inexpensive that even those opioid-dependent users who are reluctant at first to try it are ultimately persuaded by market forces when their pill of choice becomes unavailable or unaffordable. These pill initiates for the most part did not seek out heroin, in fact many initially stigmatized heroin, but as they tried to resist each stage of their transitions, their membership of a particular generation and a historical era in specific regions put them at particular risk of transition to opiate dependence and injecting. We do not know whether the pathways through heroin dependency are the same for those starting on opioid pills as for those who do not, or what influenced those users who exited pill dependency rather than progress to heroin. These questions require further study.

The importance of the racialized ethnic dynamic in shaping the emerging pills-to-heroin-injection epidemic, which emerged from the ethnography, needs to be further studied in future years in order for public health to develop better upstream structural intervention strategies to diminish the long-term harms of drug use among vulnerable populations.

Changes in the macro level opiate markets, both licit and illicit, clearly have major implications for young people's involvement with opiates and their transition to injecting drug use. Policies attempting to control of the flow of heroin, pursued for almost a century, appear to be failing while commercial interests and concern to relieve patient suffering have resulted in a second substantial opiate supply line. Awareness already exists within government of the potential effects on existing opioid users of efforts to curb the pill supply. Future policy approaches need to be carefully thought out in advance to take into account the potential impact of changes in supply on populations at risk.

Public health measures that can address and reduce the consequences of a nascent heroin sub-epidemic need urgent implementation. Surveillance on the numbers of active heroin users is a necessary starting point. Harm reduction services, e.g. overdose prevention, especially peer distribution of naloxone, and syringe distribution/exchange, need to prepare for a rise in clients and their needs. Substance use treatment services similarly need additional scale-up and funding to help stem the coming tide.

## Limitations

The limitations of our study are the usual ones for qualitative research. Ethnographic and qualitative research is subject to a number of biases including subjective sampling and response biases. Given that the events reported often occurred some years before the interview, the possibility of recall bias is important to bear in mind. These are lessened somewhat by the length of immersion in the study sites and interview styles grown out of extensive experience.

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Table 1

US Price and Purity of Heroin, 2000–2008

	Price Per Gram retailed (USD)		Price Per Gram Pure (USD)		Heroin Purity as % by volume	
	San Francisco	Philadelphia	San Francisco	Philadelphia	San Francisco	Philadelphia
2000	114.91	294.62	603.02	399.61	19.05	73
2005	87.05	269.37	755.41	503.04	11.58	53.55
2008	89.82	261.03	1058.12	435.41	8.49	59.95

Source: Drug Enforcement Administration System to Retrieve Information from Drug Evidence (STRIDE)